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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re patent application of
Frederick BELLOTT et al.
Corres. to PCT/EP02/14273
For: SOLDERED CONDENSER

VERIFICATION OF A TRANSLATION

Commissioner for Patents
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I, Susan ANTHONY BA, ACIS,
Director of RWS Group Ltd, of Europa House, Marsham Way, Gerrards Cross,
Buckinghamshire, England declare:

That the translator responsible for the attached translation is knowledgeable in the German language in which the below identified international application was filed, and that, to the best of RWS Group Ltd knowledge and belief, the English translation of the international application No. PCT/EP02/14273 is a true, faithful and exact translation of the corresponding German language paper.

I further declare that all the statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful, false statements may jeopardize the validity of legal decisions of any nature based on them

Date: June 18, 2004

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Soldered condenser

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The invention relates to a soldered condenser according to the preamble of patent claim 1, as has been
5 disclosed by EP 0 867 670 A2.

In the known condenser, after the soldering process the dryer/filter cartridge is moved into the collector, positioned there and the collector is then closed in a
10 pressure-tight fashion by a screwed connection. Since the dryer/filter cartridge is not subjected to the high temperatures of the soldering process, it is constructed from plastic and connected to the closure lid by a clip connection, and as a result the dryer/
15 filter cartridge can, on the one hand, be mounted together with the closure lid, but, in the case of a repair or servicing, it can also be replaced together with the closure lid.

20 The design and the function of such a condenser are described more precisely in DE-A 42 38 853.

In the course of the development of such a soldered coolant condenser, EP-A 1 079 186 has already proposed
25 a nonreplaceable dryer cartridge which is arranged in a collector which at the end side in each case is closed off by a soldered-in or welded-in cover, i.e. with a nonreleasable connection. Such a dryer can therefore not be replaced without disruption. A disadvantage with
30 this known dryer which is not replaceable is that it is not secured in the collector but rather can make movements within the collector. This leads to undesired abrasion and noises.

35 The object of the present invention is to improve a condenser of the type mentioned at the beginning to the effect that it can be manufactured easily and cost-

effectively and its function is not adversely affected, in particular with respect to drying and filtering.

The means of achieving this object with respect to the 5 condenser of the generic type results from the features of patent claim 1. The advantage of this combination of features for a dryer/filter cartridge which cannot be replaced is that, firstly, an inexpensive plastic housing can be used for the dryer/filter cartridge, 10 that the pipe for the collector can be manufactured from a simple semifinished pipe without additional processing, and that the dryer/filter cartridge is securely positioned and attached in the collector so that its satisfactory function is ensured for the 15 drying of the coolant and the filtering.

Further advantageous refinements of the invention emerge from the subclaims. Here, the attachment of the dryer/filter cartridge by means of a clip connection at 20 the bottom is advantageous in that a first metallic part of this clip connection, an armature part, is already present in finished form by virtue of the soldering process of the condenser. The dryer/filter cartridge which is manufactured from plastic and is 25 provided with latching elements which are formed integrally on the bottom by injection molding merely has to be pushed into the collector pipe and clipped to the bottom. This results in simple and uncomplicated mounting which in turn reduces the manufacturing costs. 30 After the dryer/filter cartridge has been mounted and attached in the collector, the latter is closed by inserting and soldering the cover plate, for example by soft-soldering. However, the closing process can also be carried out by means of a different nondetachable 35 materially joined connection, for example welding or bonding, calking or flanging.

In a further refinement of the invention, a method is advantageous which includes cost-effective mounting and the manufacture by oven-soldering, clipping and closing the container in three successive method steps. This 5 method also contributes to reducing the manufacturing costs.

An exemplary embodiment of the invention is illustrated in the drawing and will be described in more detail 10 below. In said drawing:

fig. 1 shows a collector for a coolant condenser, and

15 figs. 2, 2a show a detail of the collector in the bottom region.

Fig. 1 shows a collector 1 for a coolant condenser (not illustrated) according to the prior art, for example in 20 accordance with DE-A 42 38 853. Such condensers are referred to as the condenser module because the collector is structurally integrated into the condenser, i.e. it is arranged in parallel with one of the two collector pipes and is connected to it in a 25 coolant connection. The collector 1 therefore has a coolant inflow opening 2 and a coolant outflow opening 3. Via these two openings, the collector is therefore connected at the coolant end to a collector pipe (not illustrated) of a condenser. The collector 1 is 30 composed of an aluminum pipe 4 which is matched in terms of its wall thickness and strength to the operating pressure of the condenser. The pipe 4 is closed at the ends by a disk 5 at the bottom and a disk 6 at the upper end. In the interior of the pipe 4 there 35 is a dryer/filter cartridge 7 which is composed of a cage-like plastic housing 8 and holds in it a dryer granulate (not illustrated). The cage-like plastic housing 8 forms an enclosed space which is closed off

at the bottom by a bottom part 9 and at the top by a clipped-in lid 10, but is open to the outside through slit-like openings 11. An annular gap 12 is left between the housing 8 and the pipe 4. The plastic cage 5 8 has, in its upper region, a circumferential bead-like thickened portion 13, and in its bottom region, i.e. below the outflow opening 3, a similar annular bead 14, which thickened portion 13 and annular bead 14 are both in contact with the inner wall of the pipe 4. This 10 ensures that the plastic cage 8 is oriented in the housing 4. In the region between the two openings 2 and 3, a circumferential sealing lip 15 is integrally formed on the plastic housing 8 by injection molding, said sealing lip 15 causing the plastic housing 8 to be 15 sealed with respect to the inner wall of the pipe 4. From the level of the sealing lip 15 as far as the bottom region 9, the plastic housing 8 is surrounded (or lined) with a fine mesh sieve 16 in order to trap impurities in the form of extremely small particles in 20 the housing 8. This sieve 16 therefore functions as a filter.

A detail, designated by X, in the bottom region of the collector 1 is illustrated in fig. 2 and shows in 25 particular the attachment of the dryer/filter cartridge 7 to the bottom plate 5. The bottom plate 5 is soldered into the pipe 4, i.e. it forms a materially joined, nondetachable connection to the pipe 4 at the circumference. In the center region, the bottom plate 5 30 has an approximately rectangular slit 17 which can be seen as such also in fig. 2a. An armature part 19 is inserted and soldered so as to fit into this slot 17 by a plug-in part 18 with the same cross section. This armature part 19 is, as is shown by dashed lines in 35 fig. 2a, a planar sheet metal part and has two hook-like projections 20, 21 lying diametrically opposite one another. A sprung circumferential latching element 22 which protrudes downward is integrally formed onto

the plastic housing 8 by injection molding below the bottom part 9. The projections 20, 21 have oblique faces 24, 25 on their upper sides. The armature part 19 is already soldered, together with the base plate 5, to 5 the collector when the condenser leaves the oven after soldering. The pipe 4 is then specifically still open at the top, i.e. the plate 6 is not yet soldered in, in contrast to the illustration in fig. 1. The complete 10 dryer/filter cartridge 7, that is to say with the granulate and filter sieve 16 filled in, is then inserted into the pipe 4 through this opening until the bottom end of the sprung latching element 22 slides onto the oblique faces 24 and 25 and is thus spread apart. The dryer/ filter cartridge 7 is then pressed 15 further downward in the direction of the bottom plate 5 until the latching element 22 clicks inward and engages behind the hook-shaped projections 20 and 21 in a positively locking fashion. The dryer/filter cartridge 7 then rests with its bottom part 9 on the armature 20 part 19 and is secured, by the latching element 22, against moving in the direction of the longitudinal axis of the pipe 4. The armature part 19 and latching element 22 thus form a clip connection.

25 After the dryer/filter cartridge 7 has been securely positioned in the pipe 4 by this clip connection, the disk 6 is inserted into the pipe 4 and soldered or nondetachably connected to the pipe 4 in a pressure-tight fashion in some other way. The condenser is then 30 in the finished mounted state.